

## Exopod and protopodial endite III of the maxillae of Sarsiellinae (Crustacea: Ostracoda: Myodocopa)

Louis S. Kornicker

Department of Systematic Biology, National Museum of Natural History, Smithsonian Institution,  
Washington, D.C. 20560-0163, U.S.A.

*Abstract.*—The number of bristles on the exopod and, also, the number and distribution of bristles and claws on protopodial endite III of the maxillae of species of the Sarsiellinae (Ostracoda) are of value in discriminating species, and should be described and illustrated in descriptions of new species.

Poulsen (1965:46) stated, “Most of the species of the family Sarsiellidae differ from one another in only a few characters and the differences themselves are not very conspicuous.” The purpose of the present study is to evaluate the possible importance in taxonomic discrimination within the Sarsiellinae of two characters of the maxilla: 1, the number of bristles on the exopod; and 2, the number and distribution of bristles and claws on endite III of the protopod.

The number of exopodial bristles generally have been noted in species descriptions enabling most of the data on exopodites in Table 1 to be obtained from a survey of the literature; however, the number and distribution of bristles and claws on endite III of the protopod seldom have been noted in descriptions, requiring that most of the data on endite III in Table 1 had to be obtained from examination of specimens.

The maxilla of the Sarsiellinae has a protopod with three endites: endite I, endite II (middle), endite III (distal) (Fig. 1B, D). Distally, the limb has a 2-jointed endopod, and a single jointed exopod (Fig. 1A). The maxilla of the adult male is reduced (Fig. 1C).

When the maxilla is viewed in its natural position on the body, the basis and endopod have their broadest dimensions parallel to the carapace. The 2nd endopodial joint is curved inward towards the mouth. The short exopod is on the outer side of the limb

just posterior to the 1st endopodial segment. The endites form a diagonal row medial to the endopod with endite III lateral and slightly posterior to endites I and II. Because of its lateral location, the distribution of bristles on endite III is generally visible when the limb is viewed from the outside.

### Exopod

With the exception of some members of the *Cylindroleberididae*, which have maxillae with a quite different morphology than other families of the *Myodocopina*, the maxillae of the *Myodocopina* are biramous. The exopods of the maxillae of members of the families *Cypridinidae*, *Philomedidae*, and *Rutidermatidae* bear three bristles; whereas, the exopods of the *Sarsiellidae* bear either 1 (rarely), 2 (Fig. 2G), or 3 bristles (Fig. 2A–C, F) (Table 1).

The ontogeny of only a few species of *Sarsiellinae* are known. Three species (*Sarsiella japonica* Hiruta, 1977; *Sarsiella misakiensis* Kajiyama (Hiruta, 1978), and *Eusarsiella ryanae* Kornicker & Iliffe, 2000) have the same number of exopodial bristles on Instar I and the adult. Juveniles of both sexes have maxillae similar in type to that of the adult female.

The exopod of the adult male is smaller than that of the female and a lobe may be absent; however, the bristles of the exopod are well developed and ringed. Of the 28

Table 1.—Number of species in genera of Sarsiellinae having either 2 or 3 exopodial bristles and 4, 5, or 6 bristles and claws on endite III of the protopod. (The number of exopodial bristles is mostly from adult females, but includes a few adult males. The number of bristles on endite III is mostly from adult females, but includes a few instar IV males and females, which are believed to have the same number of bristles as on the adult; the list does not include all species in the subfamily.)

Genus	Exopod		Endite III		
	2 br.	3 br.	4 br.	5 br.	6 br.
<i>Adelta</i>	1	—	—	—	—
<i>Alphasarsiella</i>	—	2	—	—	1
<i>Ancohenia</i>	—	1	—	—	1
<i>Anscottiella</i>	—	2	—	2	—
<i>Chelicopia</i>	6	1	—	—	3
<i>Cymbicopia</i>	—	5	—	—	1
<i>Eurypylus</i>	3	5	—	3	1
<i>Eusarsiella</i>	25	34	3	4	34
<i>Junctichela</i>	1	0	1	—	1
<i>Metasarsiella</i>	0	2	—	1	—
<i>Neomuelleriella</i>	2	1	—	—	3
<i>Parasarsiella</i>	0	1	—	—	1
<i>Sarsiella</i>	13	5	—	—	4
<i>Spinacopia</i>	5	8	—	—	14
<i>Tetrasarsiella</i>	—	3	—	—	—

species considered herein of which adult males and females are known, 26 have the same number of exopodial bristles (two or three). The males of two species have three exopodial bristles compared to two on the females.

Adult females and juveniles of the Sarsiellinae are voracious predators, whereas, adult males are not. This is reflected in the reduced maxilla of the adult male (Fig. 1C); the reduction of the maxilla suggests that it is not used in feeding. The well developed exopodial bristles on the adult male maxilla suggest that they are mainly used for sensing.

If the species of the Cypridinidae, Philomedidae, and Rutidermatidae, were to be considered as outgroups, three bristles could be interpreted as the plesiomorphic character state. Then, the two bristles on some exopods of species of Sarsiellinae could be interpreted to be the apomorphic character state. However, because both two and three exopodial bristles occur on diverse genera of the Sarsiellinae, I interpret the loss of one bristle to be the result of convergence or parallelism, and probably

not of significance in discriminating genera of Sarsiellinae as presently defined.

In conclusion, the number of bristles on the exopod appears to be a useful character in defining some species.

#### Protopodial Endite III

The bristles of endite III of the reduced maxilla of the adult male are weakly developed and not considered further herein. Endite III of the adult female and juveniles of both sexes is broad and globose with well developed bristles. When the endite is flattened under a cover slip, the bristles generally appear to be along, or close to, an edge of the endite (Fig. 2). Endite III of the species studied herein bears a total of 4, 5, or 6 bristles and claws (Table 1). In the discussion below claws and bristles are not differentiated, both are included as bristles.

The number of bristles on endite III of juvenile instars was determined for only a few species (Table 2). The four species of instar I examined all have 4 bristles; the remaining instars and the adult females examined have a total of 4 to 6 bristles and

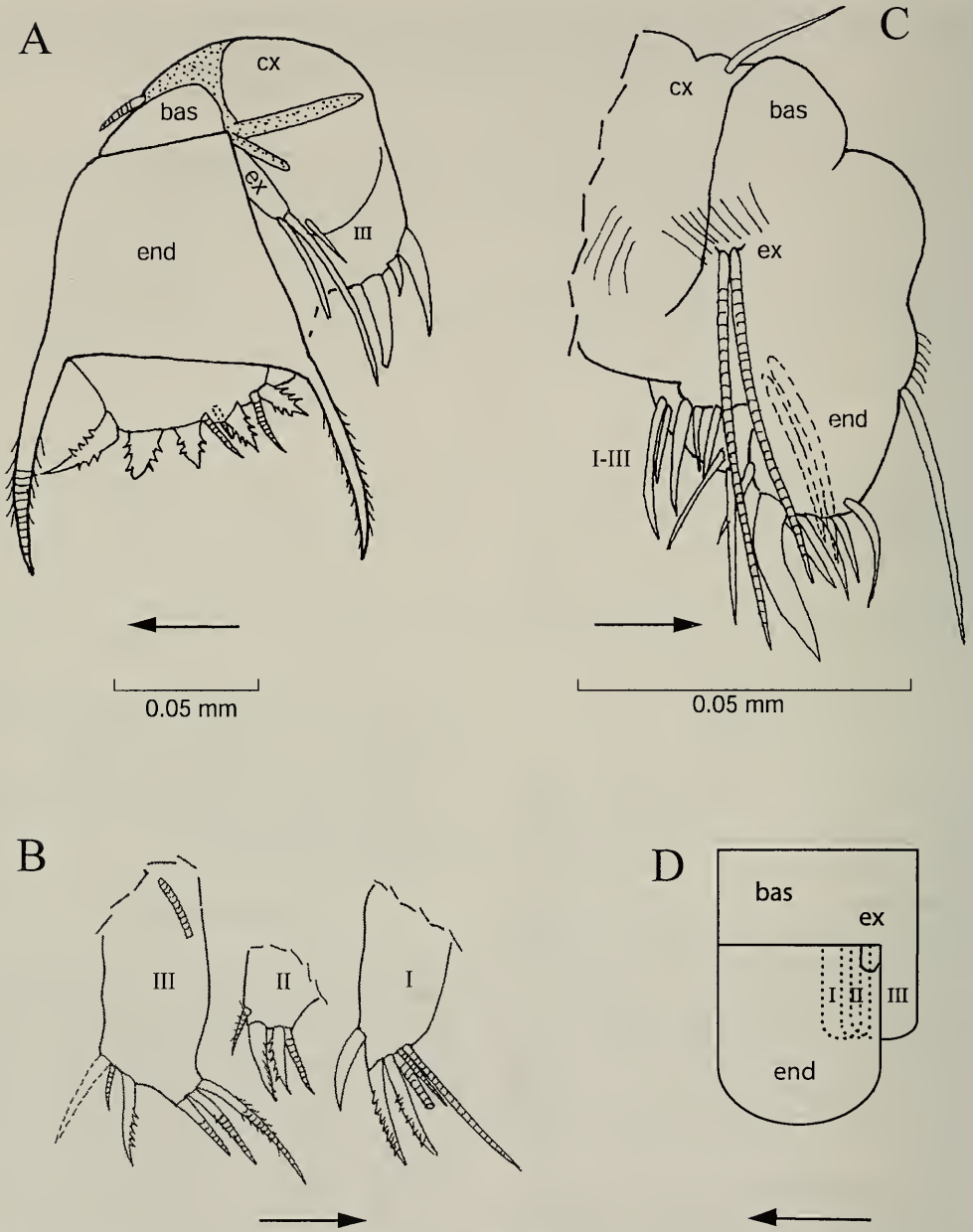


Fig. 1. *Eusarsiella ryanae* Kornicker and Iliffe: Adult female, holotype, USNM 194475. A, left maxilla, lateral view (endites I and II and 3 bristles of endite III not shown); B, endites left maxilla, medial view; C, adult male, paratype, USNM 194476, right maxilla, lateral view; D, stylized lateral view of female left maxilla. Illustrations A–C adapted from Kornicker and Iliffe (2000, figs. 18c, e and 20a, respectively.) (bas = basis; cx = coxa; end = endopod; ex = exopod; arrows indicate anterior; Roman numerals identify endites.)

claws. The species *Junctichela pax* has 4 bristles on all stages. The remaining species examined have 5 or 6 bristles on instars II–IV and the adult female, but the early in-

stars are known for only a few species. Endite III of instar IV and the adult female have the same number of bristles, except for endite III of *Eusarsiella radiicosta*,

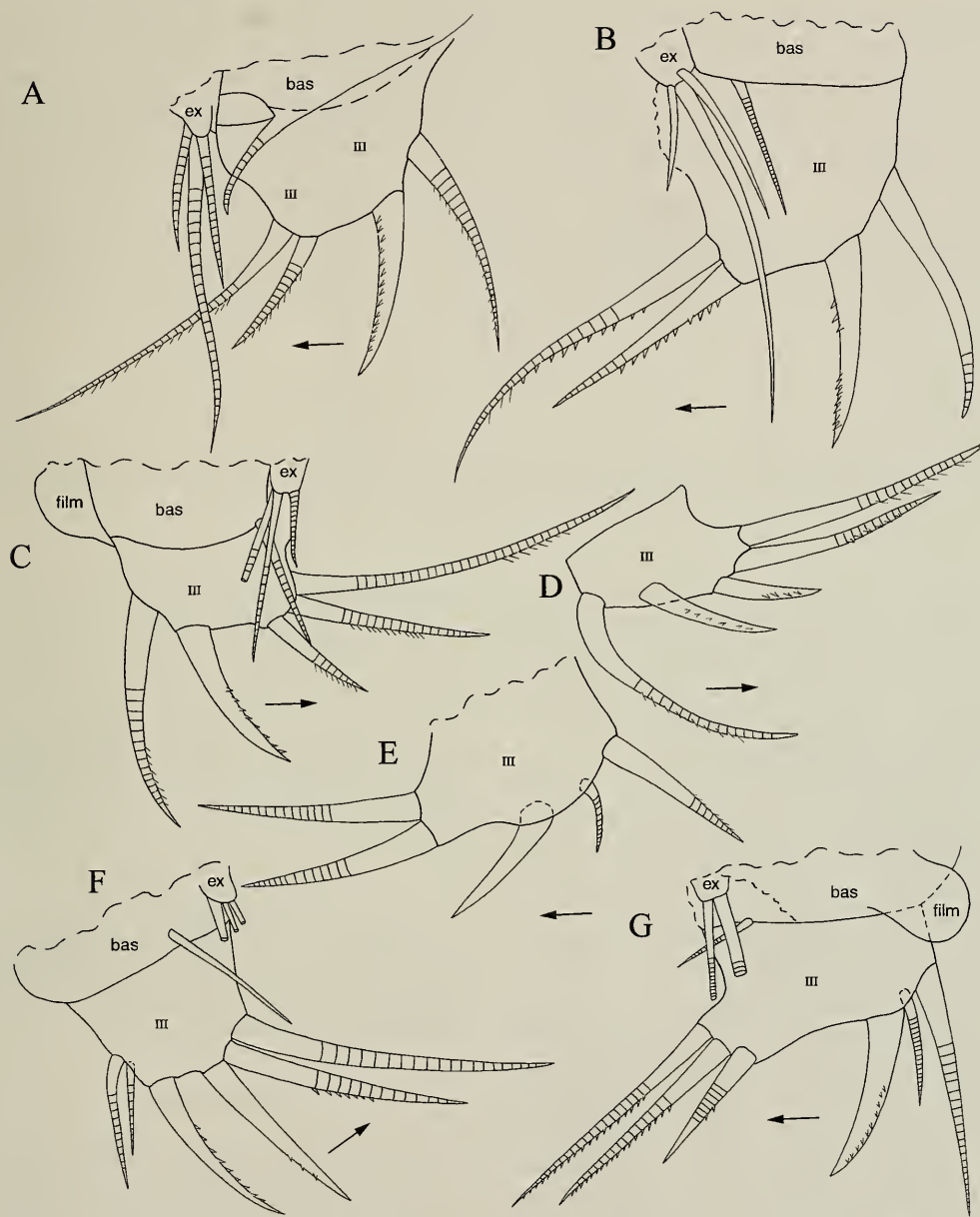


Fig. 2. Endite III of maxilla of species of Sarsiellinae: A, *Eusarsiella dispar* Kornicker, 1986, USNM 158033, adult female, left limb, lateral view; B, *Eusarsiella mawrae* (Kornicker, 1977), USNM 156739, adult or A-1 female, left limb, lateral view; C, *Eurypylus hapax* Kornicker & Iliffe, 2000, USNM 194494, instar IV male, right limb, lateral view; D, *Anscottiella vertex* Kornicker, 1991, USNM 159317, adult female, left limb, medial view; E, *Ancohenia robusta* (Brady, 1890), USNM 193623, instar III female, left limb, lateral view; F, *Spinacopia menziesi* Kornicker, 1969, USNM 122086, adult female, right limb, lateral view; G, *Eusarsiella styx* Kornicker & Iliffe, 1989, USNM 193367, adult female, left limb, lateral view. (Arrows indicate anterior.)

Table 2.—Number of bristles (includes claws) on endite III of the protopod of stages of selected species of Sarsiellinae (both sexes are combined for juvenile instars). (nd = no data)

Species	Stages				
	I	II	III	IV	Adult female
<i>Ancohenia robusta</i>	nd	nd	5	nd	nd
<i>Chelicopia obex</i>	nd	nd	nd	6	nd
<i>Chelicopia radix</i>	nd	nd	nd	6	nd
<i>Eurypylus hapax</i>	nd	nd	nd	5	nd
<i>Eusarsiella capillarus</i>	nd	nd	nd	6	nd
<i>Eusarsiella merx</i>	4	5	nd	5	nd
<i>Eusarsiella radiicosta</i>	nd	nd	nd	5-6*	6
<i>Eusarsiella ryanae</i>	4	6	6	6	6
<i>Eusarsiella thrix</i>	nd	nd	nd	6	nd
<i>Junctichela pax</i>	4	4	4	4	4
<i>Sarsiella capsula</i>	nd	nd	nd	6	6
<i>Spinacopia sandersi</i>	4	nd	nd	6	6

\* Specimen with 5 bristles on one limb and 6 on other limb.

which has 5 bristles on one limb of instar IV and 6 on the other; that species has 6 on the adult female. Because of the similarity in the number of bristles on endite III of both instar IV and the adult female, either stage is included in Table 1.

The number of bristles on endite III of 5 adult females and 2 instars IV of *Spinacopia sandersi* were counted. All had 6 bristles. Because of this it is tentatively assumed in this paper that the number of bristles is fairly constant in those two stages in species in the Sarsiellinae.

Endite III of seven species in five genera of Sarsiellinae are illustrated in Fig. 2. All were drawn with the limb flattened under a cover slip. Endite III is usually broader than either endites I and II. Endite III bears three to five ringed bristles and one or two unringed pectinate claws. On some species the anterior bristles of endite III are on a projection (Fig. 2D, E, G). The anterior bristles extend anteriorly towards the mouth, and the anterior of these is generally longer than other bristles (Fig. 2A-C). Claws are located between the anterior and posterior groups of ringed bristles and each curves anteriorly (Fig. 2). On some species two or three bristles form anterior and posterior groups separated from each other by a wide space (Fig. 2A-C, G).

In conclusion, the distribution of bristles and claws on endite III, as well as the lengths of bristles, vary considerably among species of the Sarsiellinae, and may be a valuable character for discriminating species. Therefore, I highly recommend that endite III be illustrated in species descriptions of the Sarsiellinae.

#### Acknowledgments

I thank Molly K. Ryan for inking the appendages in Fig. 2, and Elizabeth Harrison-Nelson (Smithsonian Institution) for assisting in preparation of the paper.

#### Literature Cited

- Brady, G. S. 1890. On Ostracoda collected by H.B. Brady, Esq., L.L.D.F.R.S., in the South Sea Islands.—Transactions of the Royal Society of Edinburgh 35 (part 2, number 14):489-525.
- Hiruta, S. 1977. A new species of the genus *Sarsiella* Norman from Hokkaido, with reference to the larval stages (Ostracoda: Myodocopina).—Journal of the Faculty of Science, Hokkaido University 6 (Zoology) 21:44-60.
- . 1978. Redescription of *Sarsiella misakiensis* Kajiyama from Hokkaido, with reference to the larval stages (Ostracoda: Myodocopina).—Journal of the Faculty of Science, Hokkaido University 6 (Zoology) 21:262-278.
- Kornicker, L. S. 1969. Morphology, ontogeny, and intraspecific variation of *Spinacopia*, a new genus

- of myodocopid Ostracod (Sarsiellidae).—*Smithsonian Contributions to Zoology* 8:1–50.
- . 1977. *Sarsiella maurae*, a new species of marine Ostracoda (Sarsiellidae: Myodocopina) from Bahia de los Angeles, Gulf of California, Mexico.—*Proceedings of the Biological Society of Washington* 90:676–684.
- . 1991. Myodocopid Ostracoda of Enewetak and Bikini Atolls.—*Smithsonian Contributions to Zoology* 505:1–140.
- , & T. M. Iliffe. 1989. Ostracoda (Myodocopi-  
na: Cladocopina, Halocypridinina) mainly from anchialine Caves in Bermuda.—*Smithsonian Contributions to Zoology* 475:1–88.
- , & ———. 2000. Myodocopid Ostracoda from Exuma Sound, Bahamas, and from marine caves and Blue Holes in the Bahamas, Bermuda, and Mexico.—*Smithsonian Contributions to Zoology* 606:1–98.
- Poulsen, E. M. 1965. Ostracoda-Myodocopa, 1: Cypridiniformes-Rutidermatidae, Sarsiellidae and Asteropidae.—*Dana Report* 65:1–484.